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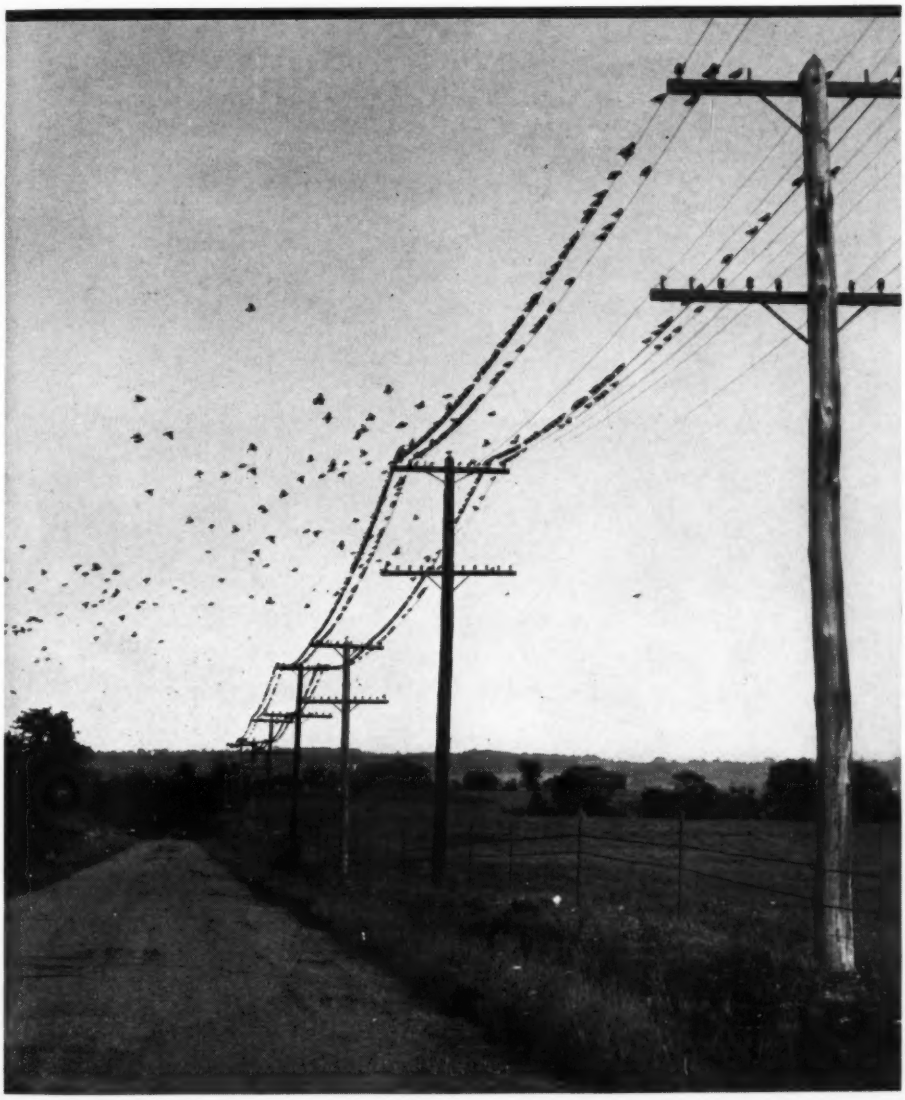

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AMERICAN POTASH INSTITUTE, INC.
INVESTMENT BUILDING **WASHINGTON, D. C.**

Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Editor*

Editorial Office: Investment Bldg., Washington, D. C.

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PLANNING HALLOWE'EN FUN

Better Crops with PLANT FOOD

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VOL. XXIII WASHINGTON, D. C., OCTOBER 1939 No. 8

Jeff interviews a few local—

Heroes Incognito

By Jeff McDermid

DESPITE their trained ferreting abilities and their well-developed sagacity and sixth sense for the human interest motif in human affairs, I often conjecture whether my brethren of the press are aware that the most important folks are those who never get into the headlines. These folks are the countless "ordinary" mortals who face danger, dilemma, and defeat courageously in some humble form of obscurity; those who taste joy and victory in achievements of an everyday, humdrum character; as well as a few whose aversion to publicity earns them only a belated, posthumous tribute in a two-inch obituary set up near the medicine ads.

My mother's scrap-book yields no end of obituaries, the yellow slips affording a sort of glowing topical index as she thumbed the crackly pages and recounted old-time acts of kindness, nobility, and charity by old neighbors and departed friends. These she treasured in her vivid memory as reflections of every bright soul whose passing radiance it had been her good fortune to witness with rejoicing.

Interspersed in her scrap-book and brown leather albums there were mingled work-a-day personalities along with

the wood cuts and encomiums of the great and near-great of her time. Much as she revered the soldiers and statesmen and other assorted geniuses of her era, as catalogued in this gallery of her compilation, I recall that she pressed the choicest of her faded autumn leaves and nosegays in those sections of the books devoted to the unheralded heroes and heroines of her own provincial walk of life.

I RECKON folks seldom keep such records these days. We have so much more garbage to wrap up, and we find the juicy scandals spread-eagled in the dailies such handy and appropriate containers for it! Possibly the chief exceptions are the small boy's sports review and his sister's box of starry-eyed heart throbbers of Hollywood. Of course they do not partake of our symbol of simplicity, although no doubt the best of these athletes and actorines have exerted some inspiring influence on our rising generation.

Successive cycles of humanity must have their public devils to shake their fists at behind the Evening Bungle, and likewise public benefactors to follow blindly and admiringly along the avenue behind the band, or sometimes, somewhat apologetically, into an awkward cul-de-sac. Just as our fathers cussed out General Coxey and worshipped William McKinley, so we too have our C. I. O.'s and W. P. A.'s and many other limelight targets for recrimination and adulation.

Yet behind and beyond all these fireworks and red ink, this static and stutter concerning these glowing "planets" in our firmament, there are myriads of stars which the crude newspaper telescope seldom discovers for us. Were it possible to see all these tiny lamps now obscured by the fiery blaze of the more showy orbs in our horizon, we might change our minds about this universe.

Lest I do injustice to my writing brethren who purvey the daily reading matter, it is but proper to credit them with featuring odd and unusual folk occasionally when the big shots take a vacation. Yet I fear they often do it in a sort of patronizing way, that is, they point out these humble, out-of-the-way persons like carnival pitch men spiel about their corn-cures and two-headed babies. They show them off like freaks. And as I do not include heroic firemen and tough-smashing policemen in my list of unsung heroes at this juncture, no slight is done the press in saying that they overlook much fortitude while filling the headlines.

Still I am delighted to see a breaking away from murders, wars, and scandals among many of my country editorial associates at least, and it is out here in the pumpkin zone where a slight and comforting tendency to seek our real normal heroes and heroines seems to be cropping up. In dishing out these heart-warming stories, of course, the rural scribes face a highly conservative element and a traditional reserve about personal affairs which sometimes forces editors to choose quickly between the desire to be explicit in public and a horsewhipping in the sanctum.

THE reason I am so anxious to turn a modest spotlight on such contributors to human values and spiritual goals lies in the chaotic situation in which we find ourselves and civilization muddling along. About all some of our fellow mortals can be sure is real are concrete man-holes and hole-in sirens. The rest is fluff and tommyrot. Even some of our preachers do not insist upon sounder idealism and finer types of heroism often enough. Their minds belong to the Biblical bigwigs. They talk too much of Solomon, Job, and Saul of Tarsus, and not enough about harassed husbands, persecuted philosophers, and reformed rough-necks in our midst today. They paint lurid pictures of Shadrach, Meshach, and Abednego, and fail to mention the chaps who singe themselves in figurative fiery furnaces upholding fundamental ideals against materialistic pressure.

Only a few years ago I heard an extension leader say that in dealing with

agriculture and rural life we must adhere to the underlying principle that mankind is motivated by three primeval forces or "drives"—the desire for profit, the urge for praise and glory, and the fear of loss or danger. He stressed the opinion that in successfully reaching farm folks, the county agents and other leaders must harp on those things and catch converts thereby. It reminds me of the pioneer preachers and exhorters.

It is not a new doctrine by any means. Yet it strikes me on the whole as cockeyed. It sews us up in a pretty small, mundane bag, and gives one little or no incentive to find those finer sides of human nature that respond to things other than profit, fear, or self-esteem.

Perhaps I might concede that in many ways and in a rough majority of times these rules may hold good, but here and there we glimpse a breaking up of those dull clouds to let a ray of something richer touch the troubled earth with glory.

SINCE the advent of the radio and the decline of the tented Chautauqua, we have allowed the brash and bold side of life to take hold of our senses to a dominating degree. The marching "men of Mars," the saving of coupons and package-tops, economic spiels and market predictions disguise our inner desires in a raucous medley of fear and greed. We are too busy scooting hither and yon nowadays to pause long enough to pitch our patched tents in some rural grove and listen to a lecture like Acres of Diamonds. No, we dub such topics soft and wishy-washy, and reach for the elixir. Give us a uke band and a gaudy leg show, and the world is ours. I maintain that some fundamental hero worship is what we lack, and it needs not be the kind that steers a bomber or mans a tank (except in home defense of swashbucklers).

This hero business resembles flint and steel, that is, given certain sets of untoward circumstances which disturb the routine of mortal lives, there are sure to arise a few examples of nobility and steadfastness. The flint of adversity is there to strike fire against the steel of character. You can't bank on it ahead or know in whom it will appear. It often runs counter to training and experience and contradicts the theory that man responds only to fear, profit, and glory. You don't have to travel the wide world to find it, for it exists wherever man abides and endures privation or maladjustment.

THE battlefield is not the ideal spot to find heroes. It is a false and artificial zone where folks are almost mesmerized with the growing horror and dread of death. Moreover, organized murder is no field in which to cultivate true heroism, and you seldom see any so-called war hero who bears his laurels with unalloyed pride. The reason for this, it seems to me, is that war heroes are the ones above all who try to answer the roll call of profit, glory, and fear. No wonder their victories are crowned with thorns.

We in our daily walks have met scores of unknown heroes of both sexes and all ages, and each of my readers might list more interesting ones than any I outline in passing here. In noting a few of these, we omit physical heroes for the most part and admit those who overcome handicaps and render services of isolated local concern. In doing so they uphold and dignify that intangible element of American character which many of us so often underrate.

Casual observers might say my first

(*Turn to page* 47)

George B. Walker, Scientist–Farmer

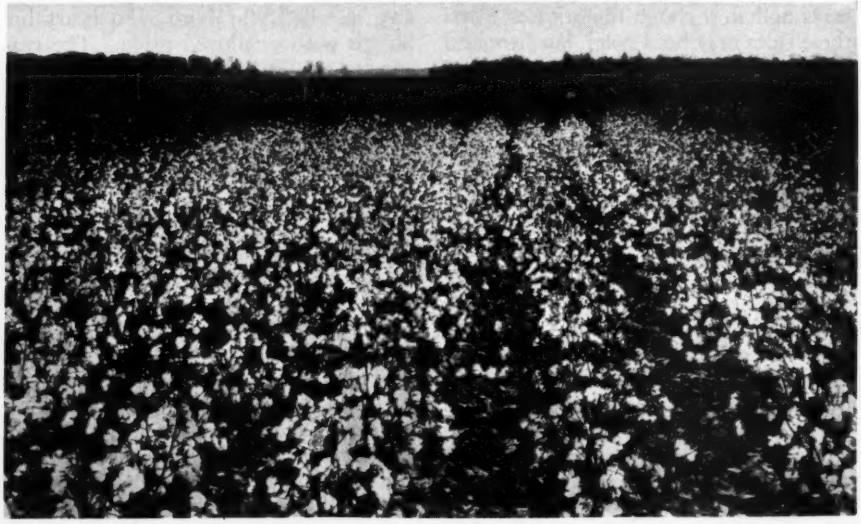
By F. J. Hurst

Agricultural Extension Service, State College, Mississippi

IF YOU will visit the little town of Stoneville in the heart of the Mississippi Delta, you will find one of the largest and most successful cotton-breeding farms in the world. The famous Delfos strains and Stoneville varieties of cotton, developed and produced on the farms of the Stoneville Pedigreed Seed Co., are now being grown extensively in the leading cotton States of the United States and in 17 foreign countries. China alone this year is growing over a million acres of Delfos and Stoneville cottons. In Ethiopia the bulk of the crop is planted to strains of these two varieties. In Mexico and in other countries a large acreage is planted to these superior cottons.

Owner and operator of this highly successful cotton-breeding enterprise is George B. Walker, a slender, quiet, modest, combination scientist and farmer, who, by developing and distributing superior strains of cotton, has made his work and influence felt throughout the cotton-growing countries of the world.

Reared on a small farm in Pike County where he worked until he was grown and where he early saw the possibilities of plant and animal improvement, Mr. Walker attended Mississippi



More than one bale per acre was the yield from this field of the famous Stoneville 2-B Cotton.

State College, where he specialized in chemistry, soils, and plant breeding. Because of his excellent record in college, he was offered a job while yet a student, and left college in February of his senior year to do educational field work in the Southern States. However, he continued his studies, completed his work, and received his B.S. degree at the end of the scholastic year.

Mr. Walker shows some of the flowers which he has developed.

His work attracted the attention of agricultural leaders, and he was soon employed by the North Carolina State Experiment Station. But he was not long to remain out of Mississippi, as he was asked to come back to the State and take charge of the Delta Experiment Station at Stoneville, where he worked for 12 years and laid the foundation for the great work done by this research institution.

Triumphed over Difficulties

In 1928 Mr. Walker resigned as superintendent of the Delta Station to join with three of the Delta's leading farmers in organizing the Stoneville Pedigreed Seed Co. After wrestling with repeated difficulties and reverses, his partners in 1928 concluded they could never make a success of the business and sold their interests to Mr. Walker.

Two years were hardly enough for Mr. Walker to place the enterprise on a profitable basis before he was hit by the 1930 drought, which was soon followed by the depression in 1932, during which he said he "scarcely knew whether he owned the roof" over his head. However, in these years he laid the foundation for success by further developing and establishing Delfos and Stoneville cottons, the superior qualities of which were beginning to be widely recognized.

So rapid has been the growth of the business since 1933 that the original 360-acre breeding farm proved inadequate to meet the widening demand for planting seed. During the past 3 years Mr. Walker has purchased two additional farms, so that he now has one of the 3 largest cotton-breeding farms east of the Mississippi River. The other two are the Delta & Pine Land Company at Scott, Mississippi, which produces the famous Deltapine variety of cotton, and the Coker Pedigreed Seed Company of Hartsville, South Carolina.

The size of Mr. Walker's cotton-breeding business is indicated by the fact that he now owns and cultivates 2,200 acres of land, employs around 40 tenant families totaling about 200 people, and has more than a quarter of a million dollars invested in land, buildings, and equipment. He has the most modern cotton gins, cottonseed-cleaning and treating equipment, and his central warehouse alone will hold over 2,000 tons of cottonseed.

Mr. Walker takes justifiable pride in the remarkable record his cotton has made. Out of 74 tests in 10 States during 1938, in competition with approximately 100 different commercial varieties and strains of cotton produced by 48 breeders, Mr. Walker's 7 leading strains of cotton won 28 first places,

C. A. Tate, plant breeder, tests staple length and lint quality of selected cotton plants.

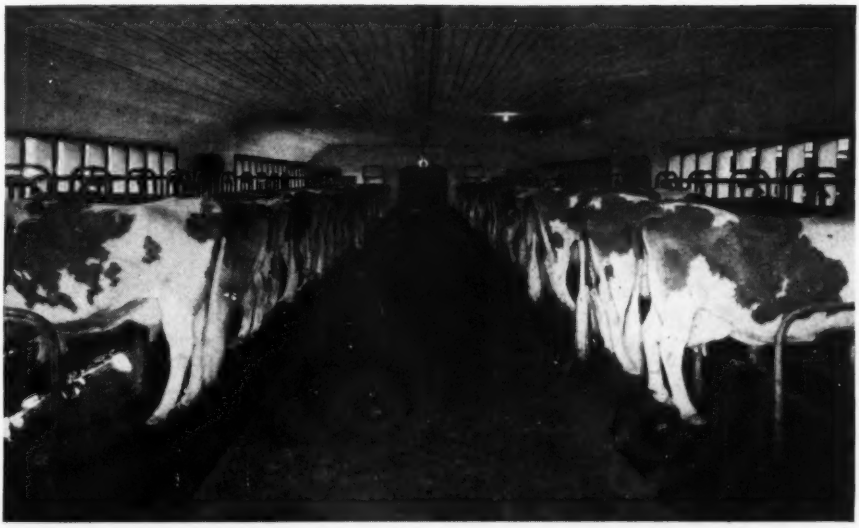
30 second places, and 22 third places. Stoneville 2-B, which Mr. Walker believes to be one of the greatest varieties of cotton in the world, because of its fine qualities and its adaptability to soils throughout the cotton-growing countries of the world, established an unusual record in the competition when it rated 20 first places, 15 second places, and 11 third places.

One the remarkable facts about Mr. Walker's cotton-breeding enterprise is that he does not do any advertising and yet ships cottonseed all over the world. He does not issue a catalog nor keep a mailing list. He says the fine qualities of his cottons and fair dealing with his customers have made a name and created a demand for his cottons. He issues a one-page descriptive leaflet on each strain for the information of buyers.

Mr. Walker also owns the second largest herd of purebred Guernsey dairy cattle in Mississippi. It is one of the highest-producing herds ever developed in the State. Starting his dairy herd in 1930, he now owns around 100 head of purebred and high-grade Guernsey cattle, regularly milks about 50 cows. With high-producing cows and a good retail market, Mr. Walker's monthly milk and cream sales now run into four figures and is second only to cotton as a source of cash income. Not until this year has he been able to produce enough milk to meet the demand. He owns and operates two milk trucks and sells milk and cream retail and wholesale in both Leland and Greenville.

His herd is headed by two magnificent purebred sires, and he is keeping all heifer calves to increase the size of his herd. Skilled feeding and good management contribute to the high production of the cow herd. He feeds the cows all of the alfalfa hay they will consume in addition to a mixture of ground oats and corn. He also feeds an abundance of silage. He has 400 tons of silage left over from last winter. He milks three times a day, as this prac-

One of the more recent projects on the Walker farm is the raising of brood mares and mule colts.



The herd of purebred Guernsey dairy cattle on the Walker farm is not only the second largest of its kind in Mississippi, but is one of the highest-producing herds ever developed in the State.

tice is claimed to increase milk production around 20 per cent.

He produces all of his own feed and swaps cottonseed for cottonseed meal. His dairy barn and herd management are models of modern sanitation. The cows are milked in a concrete barn, and each cow is washed three times each day, once before each milking. An abundance of water is available from a deep artesian well, and soap, scrubbing brushes, and hose pipe are used in washing the cows before milking.

Raises Own Workstock

Mr. Walker is now producing his own workstock. He has 18 brood mares and a bunch of fine mule colts. He believes he can make money by buying, pasturing, and feeding mule colts, and selling them as 3-year-olds. Only recently he purchased 14 mule colts, which he will graze this season, feed through the winter, graze another season, and then market in the fall of 1940. In addition to having access to good pasture, the colts are fed alfalfa hay and oats.

Mr. Walker believes in fertile soil and practices good farming. His cropping system and farming program are planned to produce an abundance of feed, improve the fertility of the soil, and provide three main sources of cash income—cotton, cottonseed, milk and cream. Mule production is now being added as another cash enterprise.

Production of alfalfa for hay, and corn and oats for grain, finds an important place in the cropping program. Mr. Walker has turned one of his new farms almost entirely over to the production of alfalfa and oats. Alfalfa is grown as long as a good stand is maintained, and it is then followed with oats for 2 years, and then again seeded to alfalfa. This year he averaged 116 bushels of oats per acre on land following alfalfa and averaged 85 bushels on 130 acres of fall-planted oats.

Bur clover is one of his favorite winter-grazing, soil-building crops. He has a mechanical bur clover seed harvester and, but for excessive rains, this year would have harvested $5,000 worth of bur clover seed.

That it requires a strong organization of trained men to handle an enterprise of this character and size is apparent. Assisting Mr. Walker is his

(*Turn to page* 40)

The Southeast Can Grow Good Iceberg Lettuce

By Fred P. Abbott

Savannah, Georgia

DIOGENES, with the aid of a lantern, searched diligently for an honest man—history does not disclose if he actually found a man who fulfilled that qualification. Southeastern agricultural workers have labored just as diligently in their efforts to find crops that would aid farmers along the southeastern Seaboard to strengthen their position in the farming and financial world. They believe they have found such a crop in Iceberg lettuce, the possibilities of which are tremendous, and because of the natural advantages there seems to be no immediate limit to the bounds of its development, provided proper methods of grading and packing are adapted and adhered to.

Displaced Other Varieties

Lettuce, one of the oldest vegetables grown, came originally from India, or central Asia, and was introduced in the United States early in the Colonial period. One wonders how a crop as old as this could offer new opportunities to southeastern Seaboard farmers. The answer is simple. For many years the Southeast has supplied large quantities of Boston type, or loose leaf lettuce, to the markets of the nation. About 20 years ago there was developed a crisp, hard-head lettuce, known as "Iceberg," which has gradually grown in popularity to the point that it has displaced the Boston type to such proportions that now only a few markets will use this loose-headed variety. Efforts to grow Iceberg lettuce on the southeastern Seaboard were at first attended with failures, while the Iceberg lettuce industry flourished in the far western States, to which it seemed well adapted. Today there are over 50,000 cars shipped annually from that area. Approximately 85% of this lettuce comes to points east of the Mississippi River, into territory that should normally draw its supplies from the southeastern Seaboard.

Iceberg lettuce of Imperial F and New York 12 strains has been produced on an experimental and semi-commercial scale for about 10 years, starting on the middle Georgia Coast and gradually progressing up through the Carolina Coastal territory, with results that were not always entirely satisfactory. Strangely enough neither of these strains did well in Florida; however, the Agricultural Department of the Seaboard Railway continued many experimental plantings in several southern States. A satisfactory strain of Iceberg was found that produces quality lettuce in Florida and in the Coastal territory to the north. In the past 5 years much progress has been made with this crop, until now considerable interest has resulted. Florida's own Manatee section has put its best foot forward this year with the successful culmination of its first commercial crop. The Iceberg plantings are continually increasing.

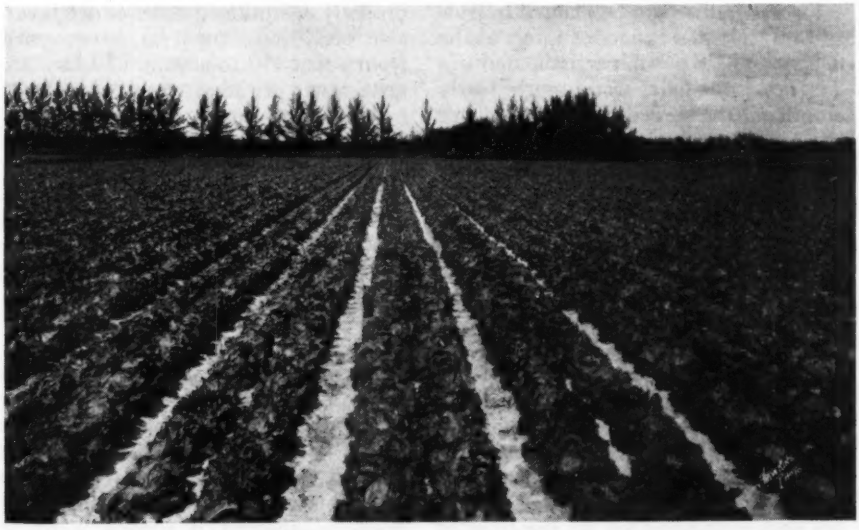
Iceberg lettuce apparently does well on a varied range of soils, but generally speaking does best on well-drained soils properly supplied with organic matter, which afford an even supply of moisture throughout the growing season. In

the Carolinas and Georgia these soils range from medium to heavy sandy loam and reclaimed rice lands, while in Florida the better grade of Leon, St. John, Portsmouth, Gainesville, and Fellowship soils is now considered most suitable. Irrigation is not essential but highly desirable. A leguminous cover crop turned to the soil sufficiently in advance of the lettuce planting to provide time for proper decomposition is also helpful.

Suitable Strains of Iceberg

There are several strains of Iceberg lettuce suitable for planting along the southeastern Seaboard, among which the most important now appears to be Imperial 847. When good seed of Imperial F and New York 12 can be secured, these strains should produce satisfactorily in the coastal territory north of Florida. Strain 44 used in an experimental way this year gives some promise, particularly on muck soil where lettuce has a tendency to produce puffy heads. Other strains, such as 515 and 615, hold some promise of sectional adaptability. Cooperative breeding work between the U. S. Department of Agriculture and the Research Divisions of several of the southeastern States is continuing and promises the development of new and better strains in the near future.

In successful Iceberg lettuce culture it is essential that the soil be in a good mechanical condition. The land should be bedded 10 days to 2 weeks prior to transplanting or seeding direct to the field, and it is generally advisable to apply the fertilizer in the bed about a week in advance of planting. The height of the bed is determined by the soil type and whether or not surface irrigation is to be used. While there is much yet to be learned on the fertilization of this crop, at the present time it is believed that the use of a commercial fertilizer containing from 4% to 6% ammonia (⅓ to ½ from organic sources), 6% to 8% phosphoric acid, and 8% to 10% potash, applied at the rate of 1,000 to 1,500 pounds per acre, broadcast in the drill or placed in the bed in bands, is sufficient for most soils that are suited to lettuce growing. Apparently lettuce does best on a soil the pH value of which is between 5.5 and 6.3, and most soils will have to be conditioned by the use of dolomitic lime-



A field of Florida Iceberg lettuce 10 days to 2 weeks before maturity.

stone or basic slag before optimum results are secured. On some soils the use of copper sulphate, manganese, and borax might be advisable, but generally should not be applied until a study by a qualified soil chemist discloses their necessity.

of June. In addition fall crops of lettuce can be made in the North Carolina territory from about the first of November to the first of December, and in the South Carolina and Georgia territory from about the middle of November to the middle of December. Yields on

To get the most profit from his lettuce, the Florida grower must maintain the quality of his product by proper packing and shipping methods.

Iceberg lettuce can be planted in beds and transplanted or seeded direct to the fields. Where possible it is best to utilize both methods, securing the early crop from the seeded bed and the later crop from seed planted direct to the field. Either single-, double-, or four-row beds may be used. In cultivating Iceberg lettuce one should practice very shallow cultivation merely to keep down weed growth and provide a mulch. Cultivation should be discontinued when the plant is about half grown.

It has been definitely proven with the right soil properly conditioned, and using the adapted strains, that good quality, crisp, hard-head lettuce can be produced, starting with the spring crop in Florida about the middle of December and continuing on up the coast of the Carolinas, ending about the middle

properly conditioned soils, under favorable conditions, thus far have varied from about 150 to around 250 Los Angeles crates per acre.

After good quality Iceberg lettuce is produced it must then be harvested at the correct stage of maturity, properly graded as to size and firmness of heads, and packed for shipment in approved containers, before it can sell in the large markets of the United States in successful competition with western-grown lettuce. It is in this operation that the southeastern Seaboard farmer has much to learn. For many years western growers of both fruits and vegetables have been noted for their ability to put up a quality package—their methods have reached an epoch of efficiency—and to meet this competition similar methods must be adopted if success is to be attained.

The western growers, up until now, have used almost exclusively what is known as the Los Angeles lettuce crate, and all lettuce that is not extremely hard-headed is discarded either in the field or in the packing house. The lettuce is trimmed, leaving several wrapper leaves to protect the head, and sized in grades of 4-, 5-, or 6-dozen heads per crate. It is then packed in paper-lined crates, with snow ice between each layer, so that each crate has uniformly sized heads, according to the marking which appears on the crate. This lettuce is then moved into the produce markets of the nation and purchased by buyers generally at the top market price; because, through long years of using the various established brands, they have come to realize that the first package will be comparable in quality and grade to the last package, and that this year's lettuce will be identical to last year's lettuce, so far as grade and pack are concerned.

Uniform Quality Desired

It is against such competition as this that the Iceberg lettuce farmers of the southeastern Seaboard find themselves pitted. In the past, not all, but a great many of the farmers in this territory have insisted on shipping practically all of the lettuce made, irrespective of whether the heads have the proper firmness and without regard to whether a package contains uniformly sized heads. In most instances this lettuce has been packed in hampers, half crates, or any other package which happens to be available. This has resulted in buyers in the larger markets making purchases of some lettuce from this territory which was good and some lettuce which was bad, as little or no uniformity existed, which was highly detrimental to future sales of this commodity from this section.

The attitude which the purchaser in the market assumed was well taken, as, due to lack of uniformity, he must take a chance when purchasing lettuce from the Southeast, and, therefore, insisted on buying it at a discount over western lettuce, even though in some cases the quality was equal to that being moved from the West. In order to establish the section as a quality Iceberg-lettuce-producing area, the southeastern Seaboard farmers must first produce this lettuce in sufficiently steady volume to attract the attention of the nation's buyers. They must then pursue a careful grading and packing process calculated to eliminate and discard anything but the very best, all of which must be very firmly headed, and when packed, the lettuce in each crate must be of uniform size and the crates properly marked.

Establish Good Reputation

It would seem to the writer that it would be much easier to establish the section by using a crate similar to that being used by the western grower, who is established in the markets, rather than to align with the southeastern section, by using either half crates or nondescript packages. There is a growing tendency on the part of the trade to demand fruits and vegetables in smaller packages, all of which is expensive to the producer, both in cost of the package and labor involved, together with the fact that two small crates normally will require more produce to properly fill than one large package of presumably the same cubical content. There has been some movement towards the use of the half-size package in the West, and if and when western lettuce growers adopt the smaller package for the marketing of their crop and it is established in the market as a standard container, then the southeastern farmers can probably use this crate without fear of discrimination.

Everyone realizes that with perishable commodities the further the consuming center is from the production station, the poorer appearance the commodity makes when it reaches the point at which it will be consumed. The western growing stations are approximately 10 days removed from the

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Tomato fields are seen on every hand in Jersey where they follow the practice of staking each plant separately. The vraic piles in the background are ready for another year's planting.

Weedless Heaven

By Ford S. Prince

Agricultural Experiment Station, Durham, New Hampshire

"IF HEAVEN is anything like this island, St. Peter is going to have a tough job keeping me out," a former dean of one of the biggest agricultural colleges in the nation confided to me as he and I walked down an embowered lane fenced on both sides with green, earth-covered walls and arched with trees growing from these banks, a lane peculiar to the Isle of Jersey and one feature of the scenery more peculiar to the island than any other.

And Heaven it is, this Isle of Jersey, especially to men of the soil who appreciate the sight of acres of waving green potato plants, chief crop of the Jerseymen, or its fruit-covered walls. Almost every farmstead on the Island is flanked by these high walls, where grow the orchards of Jersey. Pear, peach, apple, and fig trees bear their fruits there and are cultivated by the espalier system. Fruit and nectar on the "walls of Heaven."

An easily tilled soil, seaweed fertilizer thrown up daily by the sea, a perfect climate, the birthplace of a world-popular breed of cattle, and the best market in the world almost at their doorstep—this is Jersey, the gracious gift of the gods.

So far as I could see, Jersey's is a weedless agriculture. After traveling all over the island and looking at hundreds of cultivated crops, I saw not one weed. Whether the soil is freer from weeds than in other lands or whether they just work harder to keep them under control, I do not know. It appears that these farmers are very zealous for their crops, allowing nothing to creep in and steal some of the plant

food that they have used, for fear of reducing yields. Their extraordinarily high crop yields seem to justify the procedure.

Even more than most islands, Jersey is like a little world by itself. It has its own history and peculiarities. Although but 100 miles from England and 16 miles from the coast of Normandy, its agriculture is as unlike that of England or France as the people themselves are unlike the English or French.

The Isle of Jersey is about the size of our own Staten Island and is one of the oldest possessions of England. Given to Duke Rollo by Charles the Simple in 912, the Island passed to the English crown with William the Conqueror. The Norman blood that fills the veins of the Jerseymen has been modified by 800 years under English rule.

Gathering the Vraic

The Vraic Harvest, a celebration to give back to the lands what the season's crops has taken, is the most colorful and unusual of the customs developed by these agricultural people. For generations this island of farmers has set aside days to gather the vraic thrown up by the tides. Vraic is seaweed, rich in the plant foods necessary to produce the splendid crops of the Isle. Some of the vraic is applied directly to the fields and ploughed in. Ashes of the remainder used for fuel is saved and placed on the land. There is no waste in Jersey. More than 30,000 loads of vraic are gathered by the farmers each year. At the Vraic Harvest men and women gather the seaweed washed ashore by the waves. When the tide is out, some of the men equipped with a sickle-like implement cut the vraic growing on the sea bottom. The harvest goes on until the tide starts its journey shoreward. Then the harvest groups end their day's work and meet at a nearby farmhouse for an evening of dancing and feasting.

But Vraic Harvest day is not the only time that the farmers of Jersey gather their seaweed fertilizer. People along the seashore make a business of collecting the vraic. They pile it in round haycock-like stacks of about one ton each. These are either auctioned off to the highest bidder or sold at private sale to the inland agriculturists. Last summer the price of a ton of vraic was approximately 36 shillings, about $9. Some of the men I visited had as many as 100 tons of seaweed piled by the roadside awaiting a buyer.

Jersey farmers feed their land well. Besides the tons and tons of vraic given to the land, Jerseymen annually spend a half million dollars for prepared fertilizers. As there are only 15,000 acres under tilled crops, the annual application of commercial fertilizer is about two-thirds of a ton per acre. This is merely an average figure; most farmers apply much more than this. All this plant food is necessary to keep up the soil in the intensive cropping system of the Island. The mild climate of Jersey enables the farmers to plant their main crop of potatoes during January, February, and March and to harvest the tubers in April, May, and June. After the potatoes have been taken from the

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St. Mary's Lane, Jersey, one of the many beautiful lanes on the Island.

Feeding the Pasture Is Feeding Livestock

By J. F. Schinagl

Wisconsin College of Agriculture, Madison, Wisconsin

"FEED the pastures," and livestock will be fed. Good pasturage, abundant and available through the entire growing season, will produce livestock and livestock products from one-fourth to one-half the cost of barn feeding. Good pasturage, with its solid and matted root systems of perennial grasses, will hold the soil and keep the farm "at home."

"About 90 per cent of the pastures now occupying the land have established themselves without aid," says H. L. Ahlgren, professor of agronomy at the University of Wisconsin, "but man has exploited these pastures ruthlessly and efficiently."

Tillable pastures have been turned to grow other crops, while rough, stony, wet, or infertile land has been left in pasture, since cultivated crops cannot be grown on such tracts.

Because of this destruction and neglect, many pastures can no longer support a vigorous growth of forage. Essential plant-food elements like potassium, phosphorus, lime, and nitrogen have been taken from the soil and sold in the form of livestock and livestock products for too many years.

"Pastures in the humid regions of the United States have gone through five different stages of impoverishment, each followed by a lower production of forage of inferior quality," Professor Ahlgren declares.

He lists them this way:

1. Calcium and phosphorus, in the forms of lime and phosphate, have been depleted, causing less vigorous growths

This well-fertilized pasture at the University of Wisconsin produced an abundance of succulent forage.

of grasses and legumes. Organic matter, which contains nitrogen, was decreased, and so maximum growth of plants and the water-holding capacity of the soil have been reduced. Such depletions occur easily and quickly on dairy farms. For example, a 20-cow herd producing 4,000 pounds of milk annually during the pasture period, would, during 30 years, remove the equivalent of 26½ tons of 20 per cent ammonium sulphate, 9½ tons of 20 per cent superphosphate, and 3 tons of lime in the form of milk which is sold from the farm.

2. Potassium became limited more gradually than calcium, phosphorus, and nitrogen because of greater reserves in most soils. However, the same herd of dairy cows would remove 4½ tons of 50 per cent muriate of potash in the same 30-year period.

3. Since white clover is the natural companion of Kentucky bluegrass, failure to obtain dependable stands of this legume has taken place because it thrives only on moist soils which have relatively high amounts of available phosphorus, potassium, and calcium. Therefore, the organic matter has been more greatly reduced, and moisture retainment and nitrogen still further depleted.

4. Because the turf became thinner and more sparse, inferior weeds and grasses gradually put in their appearance, growing more rapidly at lower levels of soil fertility. Experiments show that an acre of land which has reached this stage is capable of supporting a mature dairy cow for only 30 or 40 days during the year.

5. Erosion is dominant in the last stage. The continual thinning out of the fibrous rooted grasses makes the soil yield to moving water. Run-off also becomes greater because the soil absorbs less moisture when the organic matter is reduced. Top soil is washed away and the pasture becomes a "vegetative skeleton."

Maintain Productive Capacity

Permanent pastures in the humid regions of the United States are now in stages 3, 4, and 5. Farmers must give serious attention to restoring soil fertility and retaining moisture if these tracts are going to support livestock grazing.

Increasing the organic matter will improve water-holding capacity, but to put more organic matter in the soil, more pasture grasses of higher yields are needed. This can be attained only by

Full stomachs fill milk pails, and filling them this way is less expensive than barn feeding.

supplying the necessary lime, phosphorus, potassium, and nitrogen.

Testing the soil is the only accurate method of determining what nutrients are needed and in what amounts. One to three tons of lime will usually correct soil acidity. Ground limestone or any form of agricultural lime may be used. Such applications should be made every 8 or 10 years if acidity reappears.

Restore Soil Fertility

Phosphatic fertilizers should be spread either in the early spring or fall. On soils that are badly run down (less than 25 pounds of available phosphorus per acre), 300 pounds of 20 per cent superphosphate or its equivalent per acre are needed. Where the available phosphorus is from 26 to 40 pounds per acre, 200 pounds of 20 per cent superphosphate will be required. When 40 or more pounds of available phosphorus are present, no application of superphosphate or its equivalent is necessary. Experiments show phosphate fertilization should be repeated every 3 or 4 years.

In soils containing less than 150 pounds of available potash per acre, about 250 pounds of a potash fertilizer are needed. Where available potash is present in amounts varying from 151-200 pounds per acre, 150 pounds of potash fertilizer will suffice. If the soil contains more than 200 pounds per acre of available potash, no potash fertilization is necessary. Potash fertilization should be repeated at 3- or 4-year intervals.

Although the soil may be put back into a state of excellent fertility, disappointing results sometimes occur unless these fertilizers stimulate the growth of legumes. Such failures indicate that available nitrogen is too low.

To build the nitrogen content in pasture soils, one of two methods can be used:

The first is to introduce white clover if the pasture is in a cool, moist climate, because this legume supplies nitrogen which will increase grass production. In dry years drought-resistant legumes, such as sweet clover, alfalfa, and red clover will encourage an unproductive bluegrass sod although they are not "lasting" perennials in permanent pastures.

Inoculating such seed with nitrogen-forming bacteria should be done before seeding in the early spring. A seed bed can be prepared by tearing up the turf of the pasture with a disk. If good pasture management is used in sowing these drought-resistant legumes, forage will be supplied during the dry midsummer when permanent pasture grasses are normally unproductive. In areas where pastures are damaged by white grubs, these legumes serve as an excellent preventive against white grub injuries.

The second method is to introduce nitrogen into the soil by applying commercial fertilizers, but it should be spread only where intensive farming is practiced and where moisture is available at all times for plant growth. Early spring is the most desirable time for applying nitrogen fertilizers in varying amounts of 150 to 250 pounds per acre and containing about 20 per cent available nitrogen.

"Such procedures supported by the other fertilizers may increase the productivity of permanent pastures from 50 to 400 per cent during the favorable spring and fall growing periods," Mr. Ahlgren explains, "and only by such methods of pasture management can permanent pastures be restored and improved."

Grow Supplementary Crops

In years when moisture is limited, growth of grass is reduced. To avoid expensive barn feeding during these periods, permanent pastures can be supplemented by growing crops like fall-sown rye, sudan grass, sweet clover, alfalfa, brome grass, or nurse crops. In this way a continuous supply of forage is insured through the entire growing period.

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Research Finds Uses For More Cotton

By C. B. Sherman

U. S. Department of Agriculture, Washington, D. C.

NEW and improved ways of processing and using cotton, by itself or in combination with other materials, will form one of the principal lines of investigation in the Southern Regional Research Laboratory to be maintained at New Orleans. From it we can expect concrete results, for this part of the research program on cotton will be headed by Robert J. Cheatham who, before assuming his new duties, was rendering unusually effective service as head of the cotton utilization research activities in the Department of Agriculture's efforts to develop new and improved uses for the South's great cash crop.

Basic to a research program aimed to extend the use of any product is a thorough knowledge of present and potential markets for that product. Studies of this nature on cotton have been a function of the Department of Agriculture for more than a decade, and have served as a guide for its technological work that aims to develop new and extended uses for cotton.

Cotton utilization in the United States is an exceedingly complex field, much of which has never been fully explored. The quantities of cotton going into the hundreds of different domestic uses are constantly changing, as are the uses themselves. New uses appear from time to time, increasing the demand for certain grades and staples of cotton, while consumption through some existing use is being curtailed or even stopped. Changes in fashions and styles of clothing and technical developments within industry contribute largely to this shifting. Obviously many of the factors that determine the quantity of cotton going into each use are often quite different from one another.

Robert J. Cheatham, recently made head of the cotton research program to be conducted at the Southern Regional Research Laboratory in New Orleans.

Never before has information on the individual uses of cotton been of such vital interest and importance. Exports of American cotton have decreased seriously during the last several years. Although there is every reason to make vigorous effort to increase world trade and to continue to export a substantial part of the American crop at a fair price,

there is also need for a complete understanding of the factors affecting its domestic utilization. This is especially necessary in connection with efforts to increase the use of cotton in this country. Such information is helpful in selecting the most worthwhile projects on which to work, provides clues to directions along which new research may be profitably undertaken, and aids in evaluating the industrial possibilities of the products of research as they are developed.

Back in 1928, when the Department of Agriculture, the Department of Commerce, and the Cotton Textile Institute were analyzing the American markets for cotton goods, Mr. Cheatham undertook to find out how much cotton the American farmers themselves were using, and how they were using it. He found that farmers, taken together, were important consumers of the crop. Not only were they using about 150 articles (other than clothing and household furnishings) made from cotton, but they suggested to him more than 60 articles that they thought might well be made of cotton. They were particularly interested in seeing it used in bagging for cotton bales and in fertilizer bags. Cotton had been tried in both but had not gone very far in either. Mr. Cheatham was already deep in a study of these uses, and before the year was over preliminary reports on both had been issued.

Investigated Cotton Bagging

How much cotton is used in some of the more important cotton articles used on cotton farms? That seemed a fair question, and a few years later it was answered by the results of an investigation of the use of cotton in cotton-picking sacks, cotton-picking sheets, and tarpaulins used on cotton farms. Approximately 50,000 bales were estimated to be so used in 1929. Full consideration was given to the competitive advantages and disadvantages in comparison with alternative materials, for the Department holds that the cotton growers should be as fully aware of the limitations as of the possibilities. It wishes to raise no false hopes.

Several workers cooperated in the study of cotton baggings. Specifications for patterns for cotton bagging were worked out in the Department and arrangements were made for the manufacture of the patterns. Their suitability from a physical standpoint was tried out in shipping tests, including overseas exports that were examined by Department men when the bales arrived in Bremen. These tests were reported in detail, and the economic possibilities and limitations were considered. During last year, cotton bagging was given an extensive trial through one of the Department's cotton-diversion programs. It gave excellent performance.

Advantages of Cotton

The cotton bagging material so developed weighs 4½ pounds per pattern, whereas the present open-mesh jute bagging weighs approximately 12 pounds per pattern. The study of the possibilities disclosed that while generally the cost of a pattern of cotton bagging was higher than that of any other type, in occasional years it was cheaper. About 170,000 bales of cotton would be required for the quantity necessary to cover an average-size crop in the first year and about 100,000 in subsequent years. Weathering tests have indicated that although untreated cotton fabric was more subject to deterioration than other types of bagging when the bales were allowed to remain on the ground, it was less susceptible to damage by sunlight and there was less damage to the contents of the bale than when other types of bagging were used.

In that early study, members of the fertilizer trade gave valuable information regarding their experience with bags made of cotton—how many they used and the sizes, their practice regarding prices or charges, re-use value of the bags, etc. This preliminary report was superseded recently by the report on a more thoroughgoing study. It was

Customers can see what they are buying when fruits and vegetables are sold in these duplex cotton bags designed by the U. S. Department of Agriculture.

shown that most fertilizer products are shipped and sold to the ultimate consumers in bags made of burlap, but that following the low prices that prevailed for cotton in 1926, bags of cotton fabric were introduced commercially and have since increased steadily in importance, particularly in certain of the Southern States.

In 1937, 82 per cent of all fertilizer tonnage was packaged in burlap bags, 12 per cent in cotton, and 6 per cent in paper. Corresponding data from the survey made 10 years earlier had showed 98 per cent of the tonnage bagged in burlap, 2 per cent in cotton, and none in paper.

It was news to many that cotton bags are used more extensively than all other types combined in Mississippi, Arkansas, Louisiana, and Texas; and they are used extensively in Alabama, Tennessee, Georgia, and Virginia. Use of cotton bags is centered in those Southern States where 100-pound containers are customary, partly because the cost differential between cotton and burlap bags is smaller for 100-pound bags than for 200-pound bags. The salvage value of second-hand cotton bags and the desire to use as much cotton as economically possible are also important reasons.

In 1937, 18 million new cotton bags were used for fertilizer, requiring 22 million square yards of osnaburg, estimated to be the equivalent of 19,000 bales of cotton. Cotton twine used in sewing fertilizer bags is estimated to have utilized an additional 1,000 bales of cotton.

Year-to-year demand for fertilizer and consequently for fertilizer bags is determined chiefly by such economic factors as income from last year's crops, agricultural price prospects, crop conditions, and prices for fertilizer. Over a longer period, the type of farming carried on, the appearance of plant-food deficiencies in the soils, and the development of suitable chemical fertilizers are important. Concentration of fertilizers increased 24 per cent between 1920 and 1936.

Used for Fertilizer Bags

Fertilizer manufacturers thought burlap was best adapted physically for handling fertilizer in 100-pound and 200-pound bags, but they preferred cotton bags for the 25-pound size. Burlap bags were preferred for protection to contents, for ease in sewing, closing and handling, and for resistance to chemical deterioration. Cotton bags were thought to be best from the standpoint of appearance and salvage value. More manufacturers said that they preferred cotton bags in reference to each factor than were actually using them.

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Farmers Go to School To Solve Soil Problems

By Watson E. Fowle

Agricultural Department, Senior High School, Traverse City, Michigan

DURING the winter of 1938-'39 a very profitable and interesting course in "soils" was conducted for operating farmers of the Traverse City, Michigan, trade area. This was in cooperation with Carl Hemstreet, Agricultural Agent of Grand Traverse County; John Jewell, Agent for Leelanau and Benzie Counties; Russel Bush, President, Grand Traverse Agricultural Conservation Association; Paul Rood, Extension Specialist in Soils, Michigan State College, and the writer.

The subject matter of the course dealt with the problems suggested in the following list:

The nature of Soils and Organic Matter; Barnyard Manure and Commercial Fertilizer; Commercial Fertilizer and Soil Testing; Acidity and Liming; Soil Erosion—How to Prevent, How to Heal It; Tillage; Soil Productivity as Affected by Crop Rotation; Systems of Soil Management; The National Soil Conservation Program, What It Is, How to Get the Most Good From It; Consultation for Improved Farm Practices.

Farmers came as far as 30 miles to attend the class twice weekly. The attendance figures were between 20 and 40, depending on roads and weather. Ninety per cent of those enrolled were farm owners. Sixty per cent of the members attending the course had left school below the ninth grade. Twenty-five per cent had completed high school, and three had had college training.

Nineteen improved farm practices were developed during the course. These were considered by the group as adaptable to Grand Traverse region farming operations. From the two lessons on "Commercial Fertilizers" and "Soil Testing," the approved farm practice of using "phosphate and potash on legume seedings or sod" was developed. Five different farmers selected this improved farm practice as one of their practices to be carried during their crop year. This represented a crop acreage of 55 acres.

Some Profitable Results

The case of George Harvey, one member of the class, is typical of results obtained by these farm practices. By applying an 0-10-10 fertilizer, he was able to double the yield on a field of alfalfa which originally was not producing satisfactorily for him. With the aid of blue prints which were supplied him by the instructors of the class, he constructed a lime and fertilizer spreader at the cost of only $5.90. This in itself, Mr. Harvey states, has paid him well for the time he devoted to the course.

A 3-year fertilizer test on the farm of E. F. Mathison of Grand Traverse County shows the value of such approved practices as this. In 1935 Mr. Mathison made an early May seeding of alfalfa. Early in June 250 pounds of 0-8-24 were used per acre. In 1936 his increase of air-dried hay was 47% above that of the check plot.

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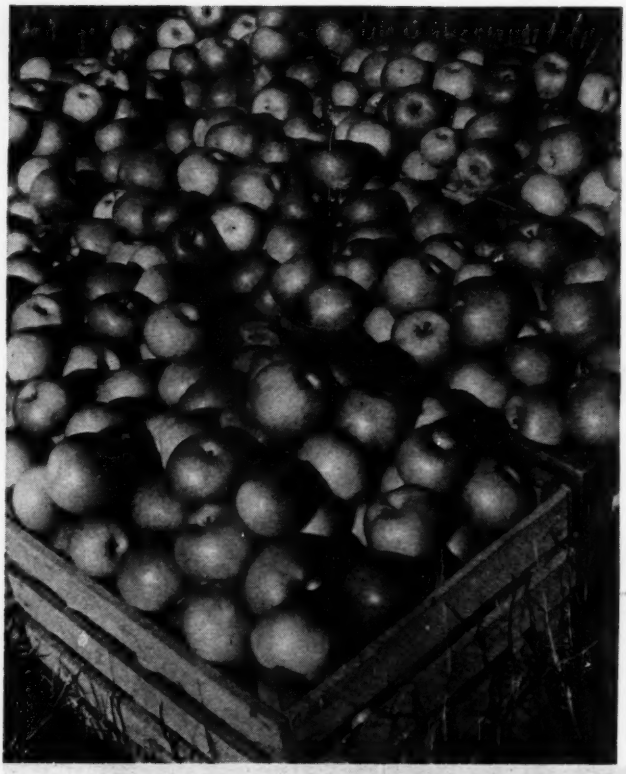
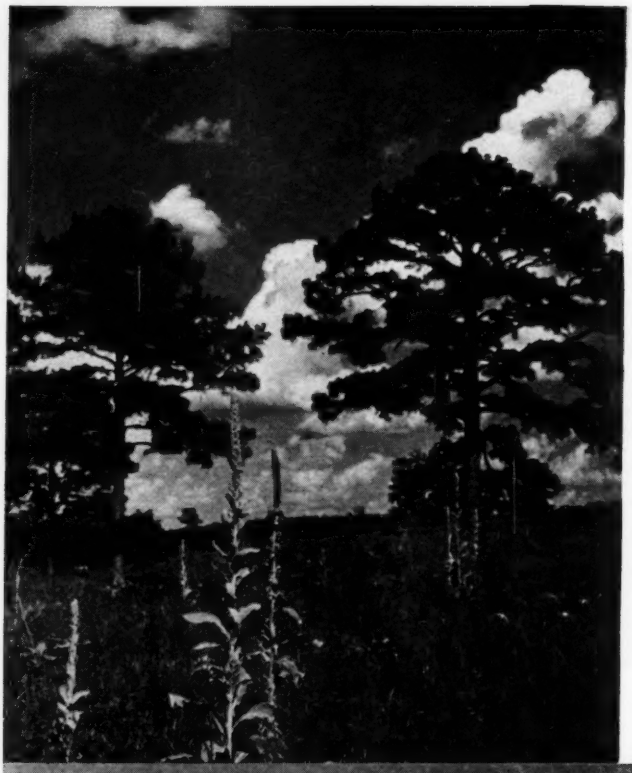
PICTORIAL

COTTON PRICES DON'T BOTHER HIM



Many a fine harvest is spoiled on its way to market. It is just as important to have efficient packing and ginning as it is to grow superior apples and cotton.

Corn shocked in the fields—grapes, dusty purple clusters, hanging heavy on the vines—autumn's landscapes diffuse a sense of security for the approaching winter.



Indian summer skies make a perfect backdrop for autumn's gay coloring.

The Editors Talk

Successful Farmers

In every community, in spite of overproduction, low prices, depressions, wars, or any other evils that down the years have befallen farmers, there have always been and are now, successful farmers, solvent at all times, efficient, and contributing of time, money, and ability towards the good of their local and national agriculture.

Every community knows them. Various reasons are given for this success: their land is good or better than average, they inherited the place, they are favored by markets, or have just had plain good luck. Undoubtedly there are many reasons for individual success—too many to mention here—but basic to all is one fundamental achievement of all successful farmers. Somehow or other, they have managed to lower their unit costs of production. Their production costs are near the minimum, so that on the average over a number of years, they realize just a little more profit than the other fellow. And it is the little repeated every year that makes success.

To achieve this minimum of cost probably involves the principle of mass production, that is, the production of a sufficient volume or number of units to enable the farmer to use labor, his machinery, and all the factors of purchasing and marketing to the greatest advantage. His truck moves a maximum load every time it moves. Because of the right machinery, his labor produces the maximum.

Consideration of low cost of production and the optimum volume, are particularly timely now, for whatever we might expect governments to do, or whatever we might think they ought to do, it is almost certain that future prices received by the farmer will not be high on the average for some years to come. Low to moderate farm prices are more probable than very high prices, even though the necessities of war may give a temporary rise. A realistic attitude towards this probability, rather than looking to and depending on Governments for relief, is a sounder basis for future success. Current useful questions are, therefore, how can the cost of production of crops, dairy products, meats, fruits, and other farm products be reduced on individual farms? How can the relative volume of each on individual farms be adjusted to further this end of low cost of production?

There must necessarily be many phases and parts to such answers, depending on the type of farming under consideration, but one thing is usually a prerequisite—successful land management. Among the urgent problems in keeping down the cost of production is maintenance of a high soil fertility. Commercial fertilizers, farm-yard manure, and cover crops have their place. Probably a balance of all three is the best, but under each heading are a number of questions that merit constant and careful consideration. That many are already seeking the answers is seen in a report that during the past season, of 30,000 farmers in 35 States who were interviewed with regard to their fertilizer practices, about half reported careful tests based on known areas and materials used. Economy in actual expenditures is often the most costly in the end. When to spend to advantage for extra labor, fertilizers, feeds, seeds for cover crops are questions that the successful farmer

keeping down the costs of production answers better than the farmer whose costs are higher.

The shifting of relative volumes of production to enable labor-saving machinery to be used, to attract the most skilled labor for the particular job in hand, and for economy in marketing volumes at the lowest overhead are typical of additional problems, but basic to low production costs is the maintenance of soil fertility. Every farmer, including the successful group, can well afford to take time out this winter to check on his current soil management methods, get the best advice possible, and resolve to get better results next year.

Movies Move Into Agriculture

Our attention recently has been called to several press notices which would indicate the increasing extent to which motion pictures are being used in bettering agricultural practices. Probably among the first films made were those by industries closely allied with agriculture. The U. S. Department of Agriculture, for some time, has employed films in agricultural extension work, and is now putting out its first sound pictures. It is reported that colored movies will be used extensively when the Vegetable Growers Association of America holds its 31st annual convention in Chicago this winter. And now comes information to the effect that farmers themselves are purchasing equipment so that locally made motion pictures can be shown in every community.

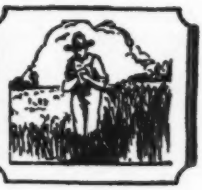
The subjects involved in this new interest are varied. That they include soil management is seen in the fact that Dr. R. H. White-Stevens of Cornell University will show before the assembled vegetable growers colored movies of mineral starvation symptoms of plants. These films will depict plants starving for nitrogen, phosphorus, potassium, manganese, magnesium, and boron. Such visual aid in identifying plant-food deficiency symptoms is recognized as being very helpful to growers, many of whom are well equipped to take immediate corrective measures through the use of irrigation and the proper fertilizers.

The incidence of local sponsoring arose in Catoosa, Whitfield, and Walker Counties in northwest Georgia where the results on 80 demonstration farms were not being visited or studied by a majority of the people in the different communities. When agricultural advisers early in 1939 asked the farmers comprising the program-planning committee what enterprise would best serve the agricultural interest of northwest Georgia, the answer was, "Locally made motion pictures that can be shown in every community."

According to reports, the first picture is a 30-minute film in natural colors showing how the demonstrators on these 80 farms have advanced their program for soil building and a higher standard of living. These demonstrators have determined the likes and dislikes of each kind of soil on their farms, determined proper land use and crops for each soil, discussed their problems at meetings, and exchanged ideas with other successful farmers. The next step has been to apply the most needed plant-food element.

That farmers are taking to movies is indicated by the more than 3,000 people in 20 Georgia communities who are seeing the shows each month. We don't blame them. We like movies too.

REVIEWS



This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture, the State Experiment Stations, and Canada, relating to Fertilizers, Soils, Crops, and Economics. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

¶ A. F. Camp and B. R. Fudge of the Florida Experiment Station explain the outstanding recent developments in the field of citrus nutrition in Station Bulletin 335, "Some Symptoms of Citrus Malnutrition in Florida." The major portion of the citrus industry of this State is located on light sandy soils of low natural fertility. When these soils are heavily cropped and are fertilized only with nitrogen, phosphorus, calcium, sulphur, and potassium, other elements necessary to plant growth rapidly become depleted or deficient. Deficiency symptoms of copper, zinc, manganese, magnesium, nitrogen, iron, and boron as they exist in many citrus groves in Florida are thoroughly discussed and profusely illustrated in color. The descriptions account for the foliage, twig, and fruit deficiency symptoms and give the generally recommended treatment for the respective disturbances.

¶ Timely queries on wheat growing in Ontario, Canada, are answered in Ontario Agricultural College Extension Circular 49, entitled "Fall Wheat Questions," by the Department of Chemistry. One of the prominent subjects pertains to suitable fertilizers. The officials state that the best method to determine what fertilizer is adapted to a particular soil is to send soil samples to one of the testing laboratories listed in the circular along with a brief statement as to previous cropping and manuring. Recommendations on the basis of the test and the information sent are made.

Because of the impracticability of testing the soil for all Ontario growers, the circular gives a few simple facts on wheat fertilization based on general experience. On heavy soils not manured or not following covers, the recommendation is 250 pounds of 2-12-6 per acre. If manured or following clover, the same amount of 0-12-10 or 20 per cent superphosphate is advised. An application of 200 to 250 pounds of 2-12-10 per acre is recommended for wheat on the lighter soils, except where manure is used or following clover, in which case the 0-12-10 analysis may be used.

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Soils

¶ According to Michigan Agricultural Experiment Station Special Bulletin 299, "Soil Management for Potatoes," about 81 per cent of the farmers in the State grow potatoes either for market or for home use. The authors, G. M. Grantham, C. E. Millar, and A. H. Mick, point out that yields obtained by Michigan growers average in the neighborhood of 92 bushels per acre; however, yields ranging from 350 to 400 bushels are secured by some. Extensive tests have been made with a view to increasing the yield per acre. With larger yields, the profit to be derived from the crop is greater, because many items of expense incurred in growing an acre of potatoes are not greatly increased by the production of a high yield.

Summarizing the results of experiments with commercial fertilizer conducted on 70 farms over a period of 15 years, the report concludes that the 4-16-8 or similar analysis gave increases in yield which were consistently among the highest produced by the various analyses tested. On the sandier soils the 3-12-12 frequently gave as good or better yields than the 4-16-8 fertilizer. For most practical purposes, the rate found most advisable was approximately 500 to 600 pounds per acre. While this rate is considerably lower than for some of the other potato-producing sections, it is said that the limited rainfall in Michigan and other factors account for the small quantity of fertilizer that can be used economically. Placing the fertilizer in bands on both sides of the seed piece, on the level with or slightly below and 2 inches from the seed, has given somewhat higher yields than the same quantity of fertilizer applied in other locations. When fertilizer was not applied near the seed piece at planting time, an application with an attachment to the cultivator at first cultivation proved advisable.

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"Conserving Soil by Better Land-use Practices," Agr. Ext. Serv., East Lansing, Mich., Ext. Bul. 203, June 1939, Paul M. Barrett.

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Crops

¶ Growing hay and making good quality hay are distinctly separate functions on any farm. Hay of the highest quality contains ample protein, vitamins,

and mineral matter, so when fed to animals they grow faster, develop better bones, and are healthier than if fed the ordinary run of hay. A number of excellent points that should be considered in producing high yields of good quality hay are outlined in North Carolina Extension Circular 237, entitled "Making Hay in North Carolina," by E. W. Gaither and E. C. Blair, and should prove very instructive to farmers in this and nearby States. The publication briefly describes and lists in convenient chart form the classes of hay and hay mixtures that are widely adopted over the State. Such information as the best time to plant, rate of seeding per acre, and quantity of digestible nutrients per ton of hay is given in the chart.

The main prerequisites in obtaining satisfactory yields are to plant adapted crops on fertile soils and employ the best cultural methods. The hay crop should be well fertilized and the soil limed if needed. Plenty of seed should be planted at the right time. Quality is attained by harvesting early, before full bloom in case of most legumes and in the milk stage for small grains. The hay should be cured rapidly and housed as soon as it is well cured.

Not more than half the plant food removed in hay is returned to the soil in manure under average conditions, the authors estimate. Hay crops should, therefore, be grown in rotations in which legumes are turned under. About 400 pounds of a balanced fertilizer per acre should be used. Good fertilizers for legumes in the Coastal Plain consist of 2-8-6 and 0-8-6; in the Piedmont and mountains, 2-10-6 and 0-10-6. The 4-8-4 and 4-10-4 plus a nitrogen top-dresser are advocated for non-legumes in the Coastal Plain, Piedmont, and Mountain districts, respectively.

¶ A good practical way to make use of "fall" leaves, lawn clippings, vegetable trimmings, and a host of additional organic waste which ordinarily present a disposal problem is to prepare a compost heap of the materials for the home garden. Arnold M. Davis, in Massachusetts Extension Leaflet 155 (revised), "Compost for the Home Garden," says that the value of such a compost, used successfully by gardeners two or three generations ago, has been too much overlooked in recent years.

In this comprehensive leaflet he tells how to prepare a "complete" organic fertilizer by supplementing the compost materials with commercial fertilizers. As the compost pile is built up, the fertilizer can be mixed with each layer of the vegetable matter. Ready-mixed fertilizer analyzing 6-8-6 or 5-8-7 is satisfactory for this purpose. One hundred pounds are considered sufficient for a pile of compost 5′ x 4′ x 4′. Where double strength fertilizers are used, the amount could be reduced proportionately.

Working the compost mass by forking it from one pile to another two or three times while in the making will hasten decomposition and give a better mixed product. By the following spring the compost is ready for the garden if properly handled, and is a satisfactory, readily available, organic fertilizer prepared very economically.

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Economics

¶ A publication which should be of interest to the fertilizer industry, particularly in the Middle Atlantic States, is that recently published by the Virginia Agricultural Experiment Station—Technical Bulletin 64, "Flue-Cured Tobacco Farm Management." It is the result of a cooperative study between the Experiment Station and the U. S. Department of Agriculture. In the summer of 1934 a complete survey was made of 620 farms in Pittsylvania County, Virginia, regarding the receipts, expenses, and inventories of the farm business as a whole and detailed costs and returns in producing the 1933 tobacco crop. Although the bulletin contains a vast amount of data regarding the cost of producing tobacco in this section of Virginia and other data relating to the farm enterprise, we are particularly interested in the sections on fertilizer.

In the production of tobacco about 48.6 per cent of the growers used only commercial fertilizer on their tobacco fields, and about an equal number used both commercial fertilizer and barnyard manure. A few farms (43) used green manure or cover crops on tobacco; of this number about 20 used commercial fertilizer, and 23 used both commercial fertilizer and barnyard manure in addition to the cover or green manure crops. Increased costs per acre were generally accompanied by the use of more fertilizer, but the farmers were compensated for their increased outlay by better yields and prices, and it was discovered that the relationship to price was more important than the relationship to yields.

There was a rather definite relationship between the labor income, the rate of fertilizer application, and the type of fertilizers used. For instance, on the farms where less than 800 pounds of low-analysis fertilizers were applied, the average price per hundred pounds of tobacco was $10.43, and the labor income was minus $228. On the farms applying less than 800 pounds of high-analysis fertilizers the average price of tobacco per hundred pounds was $12.55, and the labor income was a minus $109. The farmers applying 800 or more pounds of low-grade fertilizer per acre received $12.37 per 100 pounds for tobacco and lost $232 on labor income; and on the farms using more than 800 pounds of fertilizer of the so-called high grades, the average price was

$14.45 per 100 pounds, and labor income was only $24. Thus it appears that there is a very close relation between the fertilizer practices and the returns for labor expended. The price received from tobacco was a very important factor in determining the profit and income.

Conclusive evidence that the fertilizer practice has a close relationship to the price received from tobacco and the profit to be expected is found in tables 113 and 114. The farms have been grouped into the high-price and the low-price groups. In the high-price group no farms used the so-called low-grade fertilizer, and the average application per acre was 942 pounds. The price received was $26.84 per 100 pounds of the tobacco, and the labor income return was $618. Compare this with the low-profit group, 40.7 per cent of whom used low-grade fertilizers with an average fertilizer application of only 641 pounds. They received $3.76 per 100 pounds of tobacco and earned as a labor income a minus $629. It is of further interest to note that the low-profit group used more manure than did the high-profit group.

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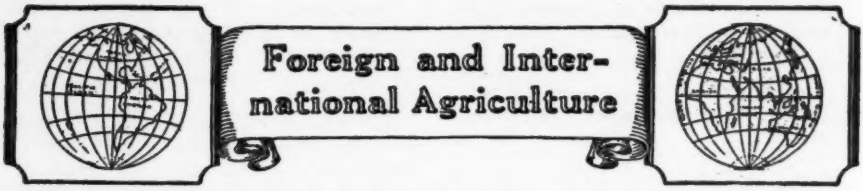
Diseases of Sugar Cane in Hawaii

AN EXCELLENT book on the diseases of sugar cane has been written by J. P. Martin of the Experiment Station of the Hawaiian Sugar Planters' Association. (Published by Advertiser Publishing Company, Honolulu, Hawaii, 1938. $8.50.) After a brief introductory chapter on plant diseases in general, the diseases of sugar cane are grouped according to the macroscopic effects on the various parts of the plant. In order that the reader can better understand the action and control of the diseases, a rather detailed chapter on the structure of the cane plant is given. The following chapters deal with the individual diseases, giving the history of the disease, description, causal organism, transmission, importance, and control. In addition to infectious diseases, those having to do with malnutrition and ecological factors also are discussed. In the chapter on malnutrition, description of the appearance of the plant when the nutrient is lacking and a brief discussion of the functions of the element are given. The elements included are boron, calcium, iron, magnesium, manganese, nitrogen, phosphorus, potassium, and sulphur. The text is well illustrated throughout and supplemented with 13 color plates of some of the important diseases and of the effects of nutrient deficiencies. The book is written in as non-technical a manner as possible with the subject, and from a practical point of view so that it will be of value and help to the grower as well as the scientist.



To supply information on agricultural research in other countries, titles and a few descriptive remarks of principal articles in the two magazines "Die Ernährung der Pflanze," published in Berlin, Germany, and "La Potasse," published in Mulhouse, France, are given here. Due to space limitation, only articles of general fundamental interest are given, although both magazines contain other articles of local interest and abstracts of outstanding articles in other publications.

Die Ernährung der Pflanze, July 1939, Vol. 35, No. 7

THE FERTILIZATION OF WHITE CABBAGE ON NEWLY RECLAIMED LAND. *By F. Vogel and R. v. Hösslin, Weihenstephan, Germany.*

Experimental work with white cabbage on a calcareous loam and on a peaty calcareous loam, both alpine soils, resulted in the leaves of plants growing on the latter soil exhibiting indications typical of potash deficiency. Plants growing on the former soil were normal in appearance. The difference in behavior could be explained in the available nutrients, and particularly potash, in the two soils, the peaty soil containing only about 40% as much as the other.

The potash deficiency was more noticeable on one variety than on another. This may well have been due to the heavier drain on the soil's potash by the one variety, the total yield of 45.8 tons per acre removing 94 pounds of potash, while the other variety yielded 39.2 tons, and removed 74 pounds of potash per acre.

When the plants on the peaty soil received manure with a complete fertilizer, there were no potash deficiency symptoms, while they were intensified on the plots receiving manure with nitrogen. The addition of nitrogen to the manure decreased the yield 11% under that produced by manure alone. A complete fertilizer with manure increased the yield 15%. Manure evidently did not supply enough potash to fill the need of cabbage for this nutrient.

The potash deficiency symptoms were typified by a puckering of the outside leaves, the edges becoming yellow. The blistered interveinal tissue, beginning at the leaf margin then became light green, later turned brown, and died. The entire leaf finally was affected by progressive spotting. The leaves became very dry, with a secondary infection with various weak fungi, producing holes in the leaves.

THE ROLE OF SULPHUR IN PLANT NUTRITION. *By R. Balks, Ebstorf, Germany.*

The author presents a rather thorough discussion of the sulphur problem in connection with plant fertilization, based on an extended search of the literature on the subject. The sulphur cycle in nature is said to be somewhat similar to that of nitrogen, but much less is known about the former. It is known that sulphur is absorbed by plants as sulphate, and is reduced in the plant to sulphide, and later may be oxidized to sulphate again. The mechanics of the processes and the various steps involved are very slightly known.

Substantial amounts of sulphur are required by the plant, with considerable variation among the various plants. As a rough indication of the amounts, the author says the sulphur needed by a plant will vary from one half to one and a half times the amount of phosphate present. Much early chemical work on sulphur contents of plant material was deceiving, since the analytical methods used permitted considerable sulphur in the plant to be lost.

Some soils are definitely lacking in sulphur, and crops then respond to its application. However, it is seldom possible to identify with certainty sulphur deficiency symptoms of plants in the field. There usually is enough of the element present to prevent the appearance of such extreme starvation signs, even though there may not be enough for optimum growth. As a general conclusion, the author feels that much more work is needed to fill glaring gaps in our knowledge of the nutrient.

THE DISTRIBUTION OF AVAILABLE POTASH IN MEADOW SOIL. *By E. Jacob, Stendal, Germany.*

Numerous experiments have shown that in general, phosphoric acid and potash applied to the soil as fertilizer tend to remain in the surface soil, with little enrichment of the subsoil. Less information being available on the movements of nutrients applied to meadow soils, the effects of applying potash to such soils were studied by determining the available potash contents of numerous soils at several depths before and after applying this fertilizer. The Neubauer method was employed to determine the available potash. About 150 pounds of muriate of potash were applied per acre in the fall, and by the next spring, most of this had remained in the first inch of soil, with little effect being measurable below the two-inch depth. Samples taken the next fall showed an increased potash supply at all depths up to 6 inches, due probably to upward movement of moisture during the dry summer and fall. Applications of phosphates also remained in the surface soil, as was expected, due to the well-known fixing power of soils for this nutrient.

The available potash at various depths in soils of good and poor meadows also was investigated. It was found that the potash supply was good in the surface and subsoils of the good meadows, while in the poorer meadows, the potash was fairly good in the first 2 inches, but very much poorer in the lower soil layers. When potash was applied to these soils, it remained in the surface of the good soils as before observed, but tended to work down more in the poorer soils.

The author believes the unequal distribution of potash in meadow soils is an undesirable condition, as the roots cannot use the potash in the top layer of soil during dry periods, and do not forage extensively through the very low layers of soil. Decreased growth and burning out of meadows results. The remedy advanced is to work up the meadow periodically, thereby increasing the nutrients in the soil layers around the 6-inch depth. Experiments conducted on cultivated soil showed that the potash would work down much more on such soil.

THE EFFECT OF POTASH ON THE GROWTH OF GLADIOLI. *By J. Becker-Dillingen and A. Wetzel, Berlin, Germany.*

In order to study the cumulative effect of fertilization on gladiolus bulbs, the differently fertilized bulbs were harvested separately and those from each treatment were variously fertilized the following year. The data indicate that potash fertilization generally increased the number of bulbs produced, and tended to increase their size, although there were some exceptions in the latter. The beneficial effect of the fertilization was cumulative over a 3-year period. Poorest results were produced by the bulbs that were unfertilized. Little difference in the keeping quality of the bulbs could be observed from the several fertilizer treatments. Another test on a simpler basis showed that a complete fertilizer produced longer stems, larger plants, and better colored flowers. The unfertilized plants were smaller and bloomed earlier, a sign of starvation. The fertilizer used contained 90 pounds of nitrogen, 80 pounds of phosphoric acid, and 235 pounds of potash per acre.

FURTHER INVESTIGATIONS ON THE CONTROL OF THE NUTRIENT STATUS OF LOESS AND SAND SOILS WITH THE AID OF THE NEUBAUER AND MITSCHERLICH METHODS CARRIED OUT IN CONJUNCTION WITH LONG-TIME FIELD EXPERIMENTS. *By K. Opitz, Berlin, Germany.*

In a project to explore the extent to which laboratory methods could be applied in determining the nutrient status of soils, the available phosphoric acid and potash by the Neubauer and Mitscherlich methods on differently fertilized plots of two fields were determined over a period of years. These results were compared with actual field yields on the plots, and with theoretical values calculated from additions of fertilizer and removal in crops.

A comparison of the data showed that calculating the theoretical nutrients present on the basis of an original determination and then correcting for later fertilizer applications and crop removals will hold only for about a 3-year period. After a longer period, the theoretical values differ too much from the actual values to be used with any degree of satisfaction or safety. The calculated values agree more closely with actual values for phosphoric acid than for potash, and on good soils better than on poor soils.

THE FUNCTION AND IMPORTANCE OF THE MINERAL ELEMENTS. *By H. Glatzel, Germany.*

A short abstract of an article dealing with the action of mineral nutrients in human and animal bodies. Potash produces specific effects on heart, and muscle action. The potash seems to be present in the tissues, rather than in the liquids of the body, in contrast to sodium. In the tissues, the potash is concentrated in those that are electrically positive, which would indicate that the potash was negative. It is known to be a positive ion, so the author concludes that the potash is not ionized in the body. This also is in contrast to sodium. Numerous physiological disturbances are associated with potash deficiency in the body, which apparently can be offset by a diet higher in this nutrient. Much is yet to be learned concerning the full function and action of potash in the body.

SOIL TYPE AND THE ROOT DEVELOPMENT OF FOREST TREES. *By H. Burger, Switzerland.*

A number of different trees were grown on several soils varying considerably in fertility. Little correlation between phosphoric acid and potash in the soil and amounts of these nutrients found in the trees could be found, except for spruce trees. The calcium and magnesium contents of the trees tended to vary with the amounts of these minerals in the soil. The root development and top growth were better on the more fertile soils.

La Potasse, July-August 1939, Vol. 13, No. 122

THE GROWING OF SUGAR BEET SEED. *By J. Dauphin,* Dreux, France.

The cultural practises and problems connected with growing sugar beet and forage beet seed in a section of North Central France are described. The culture is carried out mainly on sandy clay and silt loam soils. On the former a fertilization supplying about 25 pounds of nitrogen, 100 pounds of phosphoric acid, and 135 pounds of potash per acre is given. The silt loam soils are more fertile, and about 80 pounds of phosphoric acid and 80 pounds of potash are used, with the nitrogen remaining the same. Manure also is applied in large quantities where available.

THE EXPERIMENTAL FIELD OF LION D'ANGERS AFTER EIGHT YEARS. *By J. Valentin,* France.

This experimental field is divided into three plots, one not receiving any potash, another receiving 135 pounds per acre annually, and the third, double that amount of potash. The whole field received 83 pounds of nitrogen and 125 pounds of phosphoric acid as

a basic fertilization. Three crops were grown across these treatments in 1938, potatoes, forage beets, and forage cabbage. The yield of marketable potatoes was increased from none to 210 bushels per acre by the single potash application, and further increased 4 bushels by the double application. The yields of forage beets were increased 50% and 60% respectively by the two rates of potash, while forage cabbage was increased nearly fourfold and fivefold by the applications. The very dry summer accounts for the low potato yields.

The available potash contents of the soil in the three plots were determined by the Neubauer method to see what effects the 8 years' fertilization had on the nutrient supply in the soil. The plot without potash during that period had 14 mg potash, the soil which received the single potash application had 19 mg, and that with the double application, 34 mg. The check plot figure corresponds to about 280 pounds of potash per acre, an insufficient amount for intensive cropping. The data indicate that the single potash application has just about maintained the potash fertility of the soil, while the double application has built up a reserve supply.

THE STOCK FARM OF MOULIN-CHAPELLE. *By G. Marlé,* France.

Description of an interesting French stock farm is given by the author. The success of the enterprise is due to careful management of the herds, as well as of the soil for the production of feed. In addition to purchasing good feed, the owner fertilizes his fields that are producing forage, and feels that in this way he is obtaining a greater nutritive value from his land than he otherwise would. A complete fertilizer is used, and lime every 2 years. The phosphate-potash fertilizer such as 0-14-14 is applied each fall, with a spring application of 100-150 pounds of a nitrogen fertilizer. Prize cattle, high production of milk and butter, and profit to the owner are the result of this well-rounded program.

THE ROYAL SHOW 1939. *By R. Pollet,* Mulhouse, France.

The principal exhibits of the famous Royal Show in England this year are briefly described. Livestock, crops, machinery, and other informational exhibits characteristic of an agricultural fair as we know it can be seen at the Show. Attention was directed to the agricultural aid activities of governmental agencies. Among these activities is the testing of soils for nutrients. About half the soils tested were poorly supplied with phosphoric acid, and 83% were low in potash, results which indicate that this service of the government will be of great value to the farmer in enabling him to fertilize his fields to advantage.

Feeding the Pasture is Feeding the Livestock

(*From page* 18)

The fall seeded rye will furnish May and June grazing. If it is sown during the early summer, good pasturage will be provided during the fall months.

Sudan grass is best suited to supply pasture during July, August, and September. Its abundant yields and carrying capacity make it a most satisfactory pasture supplement. Sudan grass usually should be pastured only after it has reached a height of 18 inches to 2 or 3 feet to avoid prussic acid poisoning and to obtain the most pasture. If this precaution is taken, Sudan grass is a most satisfactory midsummer pasture grass.

Sweet clover and alfalfa will provide good pasturage during June, July, August, and again in October.

George B. Walker, Scientist—Farmer

(*From page 9*)

own son, George Rea Walker, who holds a Master's Degree from Mississippi State College and has about completed work at Cornell for his Doctor's Degree in genetics. George Rea is the only young man this writer knows who is obtaining a doctor's degree with the avowed purpose of returning to the farm. James, Mr. Walker's younger son, is now a senior at Mississippi State College. After graduating there, he expects to go Harvard and take a Master's Degree in commercial law and business administration in preparation for joining his father's business.

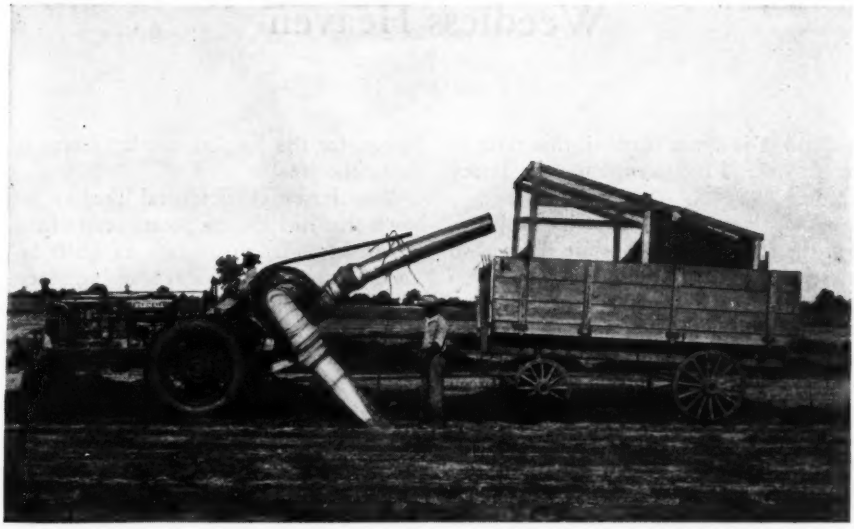
C. A. Tate is the able plant breeder and production manager of the farm. He is a graduate of Mississippi State College and has been in charge of cotton breeding on the farm since it was first organized. He is regarded as one of the most successful cotton breeders in the world.

Of the three principal methods used in plant improvement—mass selection, individual plant selection and testing, and hybridization—Mr. Tate has used individual plant selection and testing to originate and establish the famous strains of cotton produced by the Stoneville Pedigreed Seed Co. He believes this method gives more uniform and stable strains.

In addition to the cotton grown on the properties of the Stoneville Pedigreed Seed Co., Mr. Walker has contracted with eight planters in the Mississippi Delta who this year are growing his cottons under the same conditions under which they are produced on his own farms. With this plan, only the superior strains of Delfos and Stoneville cottons are grown on the contracting farms. These cottons are ginned on exclusive gins and handled in a scientific manner from the time the seed are planted until they are bagged.

Mr. Walker has a beautiful home and grounds. His hobby is the production of flowers, of which he has produced

Mr. Walker raises all of his own feed and swaps cottonseed for cottonseed meal. Oats like this yielded 116 bushels per acre.



When he harvests bur clover seed on an extensive scale, Mr. Walker uses a mechanical harvester.

some fine strains. He takes great pride in the landscaping of his home grounds, in his flower garden, and lily pond.

Likewise, he believes in providing good homes for his tenants, and on his recently purchased 1,400-acre farm has 32 of the best tenant homes that can be found in the Delta.

Southeast Can Grow Good Iceberg Lettuce

(*From page* 13)

principal center of population of the United States; whereas, growers on the southeastern Seaboard, even to the farthest tip of Florida, can place their produce in New York for third morning's delivery. One can well imagine that the appearance will be far more attractive and less wastage will result. It is, therefore, self-evident that when growers from the southeastern Seaboard place in the consuming markets a package of Iceberg lettuce of similar quality, equal in grade, pack, and uniformity, that this lettuce will sell at a premium over western lettuce, because of the fresher appearance. Due to the natural advantages encountered in the Southeast, among which are lower land rents, labor costs, and freight rates, together with higher yields, it is possible for this territory to place Iceberg lettuce in New York at, or under, the cost of production to western growers. From the foregoing it can easily be seen that if proper methods are developed and followed, there is no reason why the southeastern Seaboard farmers, at least for the months from November to June, should not realize on an opportunity, the potentiality of which has not presented itself in many years.

Weedless Heaven

(*From page* 15)

ground it is again planted, this time to tomatoes and food crops for the Jersey cattle.

Not only is the land double cropped, but the rows of the crops are planted so closely that it amounts to triple cropping. Potato rows are 20 inches apart, and seed pieces 8 inches apart. Tomatoes are planted in double rows 18 inches apart with only 27 inches between double rows. All the tomatoes are staked. It's a sight worth seeing, these acres of staked tomato plants and their bright red fruit.

The farming practices of Jersey are exemplified by C. P. Journeaux of St. Martins, whose 40-acre farm was one of the many I visited on the Isle. Here were 18 head of Jersey cattle, 8 acres of tomatoes, and nearly 5,000 bushels of potatoes harvested from 14 acres before my visit. His cattle were in excellent condition, many of them blue ribbon winners in the Jersey Show. He has sold several in the export trade; one of these animals brought $3,000 to an American importer. Journeaux plants his potato crop in February with seed produced on his own farm the year before. These seed are stored in crates above ground, 20 pounds to the crate. Before planting, the tubers are greened. Each potato is turned bud end up in the crates and exposed to light for this purpose. It takes about 40 bushels of potatoes to plant an acre because of the narrow spacing between the rows. The small potatoes are planted whole, while the larger ones are cut in half.

Journeaux expects an average yield of between 300 and 400 bushels to the acre. A ton of commercial fertilizer and all the organic material he can spare are placed on the land to be planted to potatoes. Most of the crop is shipped to England during May and June. The average potato of Jersey is much smaller than those produced in the United States, for the English market seems to favor the smaller size.

The Jersey Agricultural Society reports that in 1936 the potato crop of the island brought an average of $840 for each of the 5,040 acres in potatoes. This should make some of our own potato farmers envious, especially so when they realize that the above statements do not account for the home-grown seed held on the Island for planting or those sold locally. The $840 refers to average per acre received for potatoes sold in the export trade to England. However, 1936 was an unusually favorable season for potatoes, but sales over the past 10 years have amounted to more than $550 per acre, a lot of money in the language of any potato grower.

Combining potatoes and tomatoes grown on practically every farmstead on the Island, the gross sales amount to $3,000 just for these two cash crops, to make no mention of cows or dairy products, or grapes, pears, apples, bulbs, and flowers, all of which are exported, and of other vegetables which find a ready market right on the Island. As there are but 1,800 farms in Jersey and 600 of these are less than 2 acres, the gross income of the farmers runs very high and results in a very profitable agriculture, *the most profitable on the whole of any I have ever seen.*

Of course this income is not all velvet, for fertilizer costs run quite high, there is much hand labor to hire, while both hay and grain are purchased for the cows. Labor is not so expensive, however, as in other countries, running not much more than a dollar a day at ordinary times, and nearly $2 in rush times.

It would be foolish to say that the farmers are all contented and happy. Some of those with small acreages probably are hard put to it to make both ends meet and support their families.

A farmstead showing the high walls which enclose the orchards. Jersey farmers do not allow weeds to creep in and steal plant food from their crops, which gives the island the appearance of having a "weedless agriculture."

Many of them, however, help their more fortunate neighbors who have larger farms and who must employ much extra help during rush seasons. By and large, these men are much more fortunate than the farmers of England who, in spite of generous subsidies for one product or another, are struggling along against tremendous odds. While these Jerseymen, free of most of the taxes that their English neighbors have to bear, do without governmental aid, they have a fairly profitable time of it.

About half as much fertilizer is used on tomatoes as on the potato crop. The usual custom is to vary the formula slightly, too, by applying less nitrogen and more potash. A good many Jerseymen contract for the hand work to be done on their tomato crop from setting to harvest time. This includes staking, budding, and weeding; spraying and picking are contracted for separately. An acre of tomatoes in Jersey means about 13,000 plants, due to the planting method employed. The expected yield is about 2 pounds per plant or from 12 to 13 tons per acre.

This yield compares very favorably with a 5-ton average for commercial tomato areas in the United States, occasional yields of double this amount, and with record yields of almost 12 tons to the acre in demonstration areas. The tomatoes grown on Jersey are the small fruited sorts, similar in size to the greenhouse tomatoes of our own country.

Besides those consumed on the Island, about 12,000 tons are shipped to England. They have competed with tomatoes from the Isle of Guernsey, Spain, France, and Holland. Because of the Spanish Civil War, Jerseymen were last year getting highly favorable prices for their second season crop. The gross value of exported tomatoes brings about a million dollars annually to the Island.

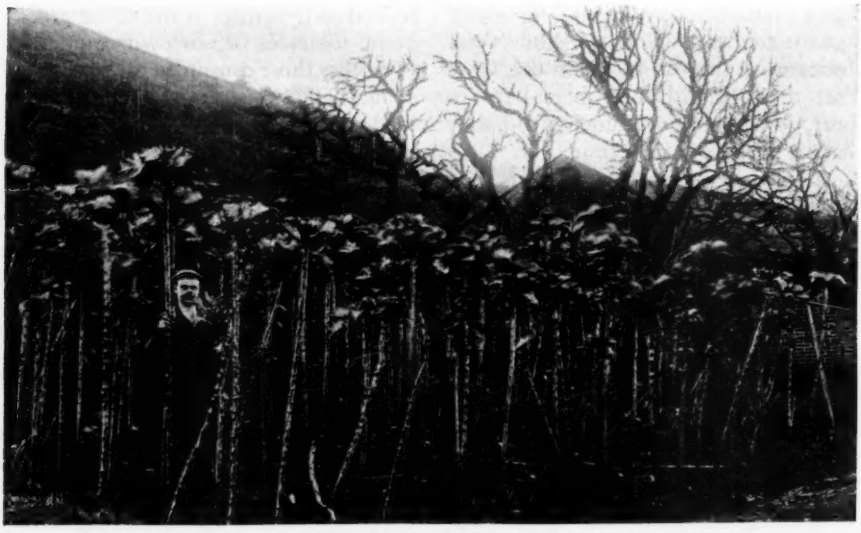
Another picturesque crop of Jersey is the cabbage crop. A species of cabbage grown by the Jerseymen grows 5 to 6 feet high. The lower leaves of these cabbage plants are stripped from the plant as it grows and are used for stock feed, while the stalk grows taller and taller.

After the leaves are picked, the stalks are cut, dried, seasoned, and made into canes which find a ready market in the tourist trade, to be carried home for souvenirs. In former times farm wives used to bake their bread on these broad green leaves. When the loaves came from ovens they carried a peculiar trade mark—the markings of the veins of the cabbage leaf. Another custom, apparently discontinued now on the Island, was to sell the fresh Jersey butter wrapped between the cool leaves of cabbages. Now the principal use of cabbage is for feeding stock, although markets still display the famous Jersey cabbage walking sticks.

Tourists come and go and probably impart to the Island its largest single business outside of agriculture. But the real interest in Jersey to the rest of the world lies in its agriculture. There is no denying the fact that the native Jerseyman is at heart a farmer, nor is there any doubt that farming there is a thriving business.

You may think it odd that up to now I have no more than mentioned the cows of Jersey—cows that are known throughout the world for their rich, golden milk. While it is true that Jersey cattle do not occupy the place in the agriculture of the island that they used to, because of the transition to cash crops, there is still one cow for each 2 acres of crop land, or more than 10,000 cattle on the Island. About 1,000 animals are exported each year, and this income boosts the cash of the farmers greatly. If we dig into the statistics of the agriculture there we find that the number of cattle has decreased 16 per cent in the past 8 years. There are still more than 5,000 cows in milk, over 4,000 heifers, nearly 150 old bulls, and over 200 younger than 12 months. Not a bad dairy industry for a little spot in the sea of less than 50 square miles in extent, or more than 200 cows for each square mile.

Pastures as such are rather rare; the animals are usually tethered during the grazing season in fields that would be cut for hay otherwise. In many cases the land is seeded after harvesting an early crop of potatoes and used for pasture. Any available land is used for pasture, but the biggest majority of ani-



Cabbages in Jersey grow from 5 to 6 feet high. This farmer uses the lower leaves for stock feed and makes canes of the stalks to sell to the tourist trade.

mals are tethered and moved two or three times a day if necessary.

If the hay fields are pastured, then it follows that a good deal of hay must be purchased; and this is the case. Not only hay, but straw and concentrated cattle foods are bought to keep the animals in high production. Very little grain is grown, as the land is much more valuable for the growing of other high-priced crops, among which potatoes and tomatoes are the most important.

Increased acreages to these two crops grown largely for export have caused the changes in Jersey's agriculture during the past 2 or 3 decades. Yawning markets in London and inability in England to produce tomatoes out-of-doors have conspired to bring about these changes.

Do not think that the Jersey farmer doesn't earn what he gets. Remember that there are no long, hard winters when these men can relax and wait for spring to come or any other off season for them. This two-crop system keeps them busy the year round, what with the crops and the cows combined. Perhaps it is just as well, for there is no place to go except in to the city of St. Helier, unless they wish to take a boat, and so far as the Island itself is concerned, they can drive completely around it in a couple of hours.

Even so, there are many beautiful things to see, lovely homes, cool, shady lanes, a marvelous summer climate, and a gorgeous coastline. But above all the outstanding example of thrift, industry, and business foresight is evident on every hand. Peaceful, industrious, and democratic folk, they go about their everyday work in a manner that might well be an example for others.

Farmers Go to School

(*From page* 22)

Three years' observations of this field show these remarksable results:

Year	Pounds yield of hay per acre First cuttings		Pounds increase
	Fertilized	Check	
1936	3,888	2,646	1,242
1937	4,480	3,680	800
1938	2,957	2,281	676

This gives a total of 2,718 pounds of hay increase, which, valued at $10 per ton, would mean a return of $13.59 for a plant-food cost of $4.75.

As a direct outgrowth of this course in 1938, 10 High School agricultural instructors and the County Agricultural Extension Agents of four counties in this area are cooperating in presenting a similar course fashioned after the Traverse City pattern of last year. The instructors conducting these courses have been meeting every other month in one of the towns of this community. Here Professor Paul J. Rood, Extension Soils Specialist of the Michigan State College, has met with the group and presented data and experimental evidence supporting the lessons to be taught. The instructors have been able to relay this material back to their class members. This is giving operating farmers in a wide area an opportunity to learn recent findings on soil management problems. In these 10 schools there are over 300 farmers enrolled during the winter months.

From systematic instruction, as given in these communities, the experience of

having crop increases on legumes, as given in the two cases, will doubtless be repeated many times. Many acres will doubtless be represented by the farmers who adopt that one approved farm practice of using "phosphate and potash" fertilizer with a crop of legumes.

Operating farmers studied soils at the adult farm schools conducted last winter in the Traverse City, Michigan, region.

Research Finds Uses For More Cotton

(*From page* 21)

Low prices for cotton osnaburg, in 1931-32 and since 1937, narrowed considerably the margin between the cost of burlap and of cotton bags. This greatly stimulated the use of cotton bags. Low prices for cotton bags justify economically their additional use for fertilizer, especially in those sections where used cotton bags have a high salvage value.

Only about 12 per cent of the fertilizer tonnage is now packaged in cotton bags, but if the entire tonnage were so packaged, it is estimated that at least 135,000 bales of cotton would be required annually.

Important uses of cotton-making in other containers (varying considerably in value of the product used) have been studied in connection with the wholesale grocery trade, the flour mills, and the cement industry. Always the alternative products for containers were studied in comparison, and frank statements of competitive advantages and disadvantages of the use of cotton have been made public, together with an indication of the possibilities under certain conditions.

Cotton used in the tire industry—the largest single use of cotton in the United States—has been of great interest for a number of years. This use through the changes and improvements in the manufacture of tires and tire construction has been a continuing line of study, duly reported upon to the public.

Based upon their findings in these utilization studies, many new and improved cotton products have been developed in the technological laboratory by these workers. In addition to cotton bagging, Mr. Cheatham and his assistants have developed several types of cotton bags for shipping raw sugar which are now undergoing actual shipping tests. A potential new market for cotton exists here for about 120,000 bales. A cotton fabric for curing concrete has been developed, which has approximately the same absorbent qualities as the jute burlap generally used

and possesses approximately twice the life of burlap.

One of the first and best known products developed by Mr. Cheatham was a duplex cotton bag for the consumer packaging of fruits and vegetables. Millions of them, which range in size from 4 to 100 pounds capacity, have been made and sold by commercial concerns. These bags have been patented by the Department and the patent is dedicated to the public.

Mr. Cheatham points out that the new uses developed in the past have not been spectacular, and that they are not likely to be in the future. But during the long time he and his assistants have been studying possible places and articles in which cotton might be used profitably, or where cotton, with its properties altered, would serve better than materials now being used, these surveys have not only provided information to guide technological research, but have provided findings that are telling cotton growers where they stand in relation to other producers of many competitive products, what the possibilities and limitations are, and what the prospects.

Heroes Incognito

(*From page* 5)

example smacks of "false pride," but let others judge. A widow was left with a small farm and four children under twenty-one. It was customary for such bereft folks to seek federal aid in one or more ways and be half-way grateful about it. But this redoubtable woman came of pioneer stock, and she wanted her brood to wax mighty in self-preservation and self-help. By devious plans and untold hardships she managed the farm with one son, sent two more out to labor at day work and cow testing, and she grubstaked the girl to a short course in stenography. In the face of ruinous prices and sacrifice of alleged standards temporarily in the home, this family under her guardianship came through with sailing flags. During it all she led a 4-H club and engaged in Americanization work among some foreign-born neighbors. Not being on any WPA strike committee, this lady did not make the headlines and she never will.

I know a farm couple who declared their useful parental days were not over after they had matured four youngsters of their own. Instead of drawing into a shell and being content as grandparents, these lively folks made it a practice to adopt an underprivileged city child each year or so, and when they were about sixty years old they had raised a dozen useful young men and women under the healthful atmosphere of country life. No, they did not take these kids in as drudges to save hired labor, but they gave them a well-balanced mixture of worthwhile tasks and practical educations. Now they have the satisfaction of seeing five of these adopted ones earning money enough to satisfy the needs of themselves and give some aid to their own natural parents, whose years of grinding factory employment are gone. Surely these honest elderly people defy measurement in the "rule of three" proposed by my cocksure extension man.

One of my best farm friends was left the father of eight children at the death of his wife a score of years ago. He hired a housekeeper for awhile until his eldest son and daughter decided that "they and Pa" could go it alone and make something out of the home as well as take good care of the family, the youngest of which was a year or so old. "Pa" told me he accepted the challenge

with some misgiving, but he tried to remember what "Ma" would have wanted under similar conditions and circumstances, not overlooking prayer, balanced rations, clean clothes, decent books and music, and community enterprise. Today his housekeeper is the original baby girl, and when she goes he will move in with a son to spend his remaining years. The children are all farmers residing in the same county, their acreage is extensive and paid for, and several of the boys are conservation committeemen. (Some may point out that my friend was probably *in fear* of a stepmother, but as he got along well with his mother-in-law, I ignore the charge as groundless.)

AT THE suggestion of a county agent lately, I visited a country district school different from any in my State and which a hasty opinion might underestimate. Presiding over forty pupils from six-year-olds to 4-H club age was a man teacher about fifty. He lived on a farm a mile distant with his son, and during vacation he wrestled with the crops like any of his neighbors. A graduate of a normal college, he had taught that school for thirty years straight, after serving two terms as assistant county supervisor. His idea is simply that no service is of greater present and future value than giving rural children the best possible guidance by a mature person. He is a club leader as well, and imparts civics, cooperative marketing, and soil conservation with all the ability of a trained dirt farmer. Check him up with the motives of fear, profit, and glory and see what you get.

Many agents of the extension service themselves belie the claim that all efforts are directed by those three primary forces affecting humanity. I know one field crops man who spends as much time afield from one week to another and makes more speeches than any ambitious politician, and sacrifices more of his leisure hours to other people than the average country doctor. Moreover, he runs a Sunday school and helps his wife direct a juvenile craftwork class at week ends. The woods are full of such folks in agricultural education, and rare indeed are those in its fold who measure their lives by profit or glory. In fact, if those were the goals they sought most, we would find them in other fields for which the same training would ably fit them.

TAKING in my whole experience as a farm observer, I can truly say that seldom have I been stopped by rural folk merely to look at the size of a milk check, the profitable fatness of a shoat, or the glory of some landed ancestor. They have called my attention to progress with modest pride; but pride in tasks well-begun and soils well-fertilized and crops well-harvested, to my notion, has little to do with vainglory, if tempered with prudence. What they have been most apt to dwell upon in reference to their lives have been the peace and plenty of a happy community, the rearing of a better generation, and the adornment of the farmstead with arbors, lawns, and flowers.

Recently Colonel Lindbergh gave voice to the idea that our American task is to treasure and multiply the inborn gifts, skills, and talents of the various European descendants here, so that we as a nation may preserve this kind of "heroism," — the only kind worth perpetuating in a civilized world. It means that the achievements of peace, however humble and unheralded, will long outlive the forces of hate and destruction.

And lastly in my analysis of heroes, I cannot overlook a strain of good humor persisting in us all; so in closing I toast the ones most likely to have achieved the title without much public acclaim, namely, your wife and my wife. By residing with us and putting up with our foibles, with but one requirement—to give sound and frequent advice—is surely a brand of heroism without glory, minus profit, and one utterly devoid of fear.

DOUBLE ERROR

A young school teacher entered the bus and sat down. She looked at the gentleman across from her and smiled very sweetly. He looked puzzled. Realizing that she didn't know him, she stammered:

"Oh, sir, please forgive me. I thought at first you were the father of one of my children."

At the next corner she left the bus.

Helen: "I don't see why he dates her—she's a terrible dancer."

Mary: "No, she can't dance, but she sure can intermission."

Mother—"Bobby, let the baby play with your marbles. Don't be so selfish."

Bobby—"But, Mother, she keeps them and won't give them back."

Mother—"Nonsense, dear. Of course she'll give them back."

Bobby—"She won't, either. She's swallowed five of them already."

When a war veteran was in the hospital recently, he challenged every knock at the door with, "Who goes there? Friend or enema?"

When the newlyweds boarded the train the embarrassed groom tipped the porter liberally not to disclose that they were just married.

On the way to breakfast next morning the couple was the object of many grins, stares, and craning of necks. Furious, the groom upbraided the negro porter.

"Nassuh, Boss," George replied. "Ah didn't tell 'em. When dey asked me if you was just married Ah says 'No Suh, dey is just chums.'"

Said an excited citizen to a candidate: "I wouldn't vote for you if you were the Angel Gabriel."

To which the politician replied: "If I were the Angel Gabriel, you wouldn't even be in my precinct."

New Circus Actress: "You know, sir, this is my first job in a circus. You'd better tell me what to do to keep from making mistakes."

Manager: "Well, don't ever undress in front of the bearded lady."

An Irishman had been thrown over a fence by an enraged bull. He had just recovered when he noticed the bull pawing the ground and furiously tossing his head.

"If it wasn't for your bowing and scraping," said Mike, "I'd think yer threw me over on purpose."

TOO MUCH CAMOUFLAGE

Two farmers were waiting for their train, when along the platform tripped a fashionably dressed damsel, complete with lipstick, rouge, and powder. The two men gazed at her speechless for a moment. Then one spoke:

"Man Tam, what dae ye think o' that, noo?"

"Think," exclaimed the other, "nathing ava'. It's gey puir land that needs sae muckle top-dressing."

Entries in a small boy's diary:

Feb. 24: Got an air gun for my birthday.

Feb. 25: Snowing. Can't go hunting.

Feb. 26: Still snowing. Can't go hunting.

Feb. 27: Still snowing. Shot at Grandma.

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